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Biology Adventure Hour

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Two years ago Corvallis High School added a second year biology course to the curriculum. This was not to be just an additional biology course that would be in regular sequence to Biology I. We had in mind a very special type of work for that student who had an interest, aptitude, and genuine liking for biology. We were interested in offering a course for junior naturalists — those young people who have a deep-seated curiosity about the workings of nature. Biology I is a mere scratching of the surface, as we all know. If, for example, a student was particularly interested in protozoa, it seemed an injustice to study these micro-organisms for two weeks or so and then pull him away to study something else. Why couldn't we let that student study protozoa all year? From such an idea grew a high school biology course that was designed so that each individual pupil could explore various fields of biology, and make his own choice of study.

The Biology II class as inaugurated did not and does not now include examinations, oral reports, written work to be handed in, or in any way resemble the usual formal class organization. We learned from the first year that certain requirements must be set, however, and that the student must meet these requirements. We had accepted for Biology II twenty or so of the best biology students of the preceding year. We had hoped that each of these people could meet the challenge of choosing work of particular interest to him and go ahead on his own. No requirements had been made. The result was that eight or nine students could not settle down to serious labors without the conventional and usual pressures forced on them by a normal school situation. We solved this problem the second term of that initial experimental year. A compulsory reading period of several weeks was set up. The reading material was carefully chosen to appeal to the high school student and at the same time give him factual information. We did not use the usual high school biology textbooks here; we chose rather, those books that read like the nature stories often found in *Readers' Digest*—stories of animals and

plants that appeal to anyone, biologist and layman alike. The reading period was exploratory in scope, a means by which the individual pupil could find a specific topic of interest. After a topic was chosen, then library research work was done. We found that the students liked this sort of thing so much that it was with some difficulty that we could get them away from reading and on to experimental studies. This was worked out by allowing them to take the books home for out-of-class reading.

Observation of things biological is the backbone of our course, and the requirements here are simply to make notes and a few drawings (if applicable) of the life observed. We learned that the pupils felt more like scientists or naturalists if a scientific approach was made.

Several of the people worked on individually prepared cultures of protozoa.

FIG. 1. Biology II "protozoologists" at work in the laboratory. In the background is a pupil-designed insect cage, having several compartments for various species of live insects.

Identification of the animals was the primary goal we set for the student. The results were amazing and most gratifying. The challenge of this difficult job seemed to make the work of increasing interest to our microscopists, particularly since we demanded positive identification. Here the limitations of the knowledge of the instructor was almost a help. It took us, instructor and students, days at a time to make sure of the identifications.[1, 2] What a stimulus that has been! A teacher and his pupils will have to experience working with the unknown before understanding this situation. One pupil, a basketball player, did not go to assembly to receive his letter because his interest was that keen on protozoans! That assembly had been scheduled for the fourth period—our Adventure Hour.

Our projects have developed in the last two years into more and more varied kinds of research. It is one thing to ask pupils to carry on a project in a regular biology class, and quite another thing to deal with projects that will be worked on daily for weeks at a time. It is with this in mind that we have our reading period mentioned above. One of our pupils that first year read about the removal of the nucleus from an ameba. This would make a good experiment in his studies, but where was he to get a micro-needle? He found that glass tubing of very small diameter could be drawn out over a flame till it was as thin as very small wire. With this instrument he removed the nucleus from an ameba. It was not the neatest of operations but it complimented his ingenuity and increased his interest in biology. Another student has discovered the use of methyl cellulose in slowing protozoa.[3] He found that this material could be obtained at a drug store under the trade name of *Cellothyl*.

A project of interest to some is observing the development of a chick embryo. We have made an incubator, complete with thermometer, and in the incubator two dozen fertile hen's eggs can be placed. Daily, after three or four days,

[1] *Fresh Water Biology*, Ward & Whipple.
[2] *How to Know the Protozoa*, Jahn.
[3] *How to Know the Protozoa*, p. 17, Jahn & Jahn.

the pupils open an egg and note the development of the embryo. A certain amount of library research goes along with this. We borrow bird skins from Oregon State College, and those persons interested learn to identify the speeimens with the help of Roger Tory Peterson's *Field Guide to Western Birds.* Three pupils this year are working on a study of animals in the soil. A large funnel with a small screen at the bottom is being made. Into the funnel will go several shovels full of dirt. A light bulb will be suspended so that it will be above and almost in the large opening of the funnel. It is hoped that the moisture line in the soil will go deeper and deeper, taking with it any animals that the soil may contain. Under this apparatus will be a bottle of preservative to catch animals that fall through the screen. Identification of the animal life is our goal. This is not our idea but one found in reading *A Multitude of Living Things* by Milne & Milne. We hope also to do some of the experiments described by J. Henri Fabre.

Examination of the flagellates in termite intestines has proved to be a valuable and enjoyable laboratory experiment. An outdoor project is the observation of the sexton beetle at work burying a dead mammal. A survey of the life in a small plot of ground and a section of a stream will be made this year. Our laboratory will abound with animal and plant life. Special germinating boxes for growing all maner of plants, including fungi, mosses, and ferns are available. We have our rats for nutrition experiments, frogs, snakes, and mammals are going to be brought in, a termite colony and an ant nest will be observed by our pupils. Preparation of permanent slides is an activity we have not overlooked. Many projects will be carried on that have not been mentioned here. Several projects are just in the idea stage and we are seeking new experiments all the time. We will use the last nine weeks of the year in classifying seed plants. Every pupil will have a copy of Gilkey's *Handbook of Northwest Flowering Plants* plus all the tools necessary for plant dissection and study. This has proved to be a wonderful laboratory situation in which students and instructor work together identifying as many plants as possible.

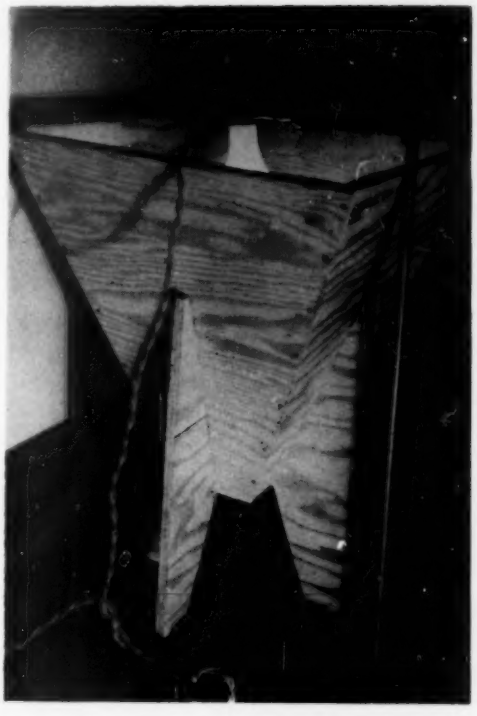

FIG. 2. A plywood "funnel" designed by pupils to test the moisture relationships of smaller animals found in soil. The "funnel" is partly filled with a sample of soil, and animals that fall into the preservative bottle, as the moisture level lowers, are studied and classified.

The success of this informal approach to biology is shown by the pupil demand for the course. The idea of such a course is not new, but it has been put into practice at Corvallis High School and the results have more than justified

having Biology II as part of the school curriculum.

SOME REFERENCE BOOKS FOR A NATURAL HISTORY LIBRARY

The Book of Naturalists, Wm. Beebe
Mammals of North America, Victor H. Cahalane
Insect Adventures and other books by J. Henri Fabre
Multitude of Living Things, Milne & Milne
The Lost Woods, Days Without Time, and other books by Edwin Way Teale

MEMBERS OF THE NATIONAL ASSOCIATION OF BIOLOGY TEACHERS will be specially interested in the J. B. Lippincott Co. advertisement on page 46 of this issue. The Vance who is the co-author of the excellent *Biology for You* and *Biology Activities* is of course our B. Bernarr Vance, assistant editor of *The American Biology Teacher*. And the Miller is our D. F. "Dave" Miller, who is a frequent contributor to *The American Biology Teacher* and a member of our advisory staff.

Best wishes to both of them.

JOHN BREUKELMAN

"Painting" with Bacteria

SISTER MARY THOMASINE PATTERSON
Mount Mary College, Milwaukee 10, Wisconsin

We read with great interest a recent article by Sister Mary Aquin (1) which appeared in *The American Biology Teacher*. She gave an account of the growth of chromogenic bacteria according to some pattern. We use a modification of the experiment which may be of interest to teachers of bacteriology.

The effects of various chemicals upon the growth of bacteria is an important topic in general bacteriology. This leads into a discussion of antiseptics, disinfectants, and the phenol coefficient. This, we presume, is usually demonstrated in the laboratory by inoculating nutrient agar with a species of bacteria such as *Staphylococcus albus* and pouring it into a Petri plate. Later small squares or discs of filter paper, saturated with the antiseptic being tested, are placed upon the surface of the agar and all is incubated for 24 to 48 hours. After the period of incubation the zones of inhibition of growth about the discs are noted, and their relative sizes are used to give a rough estimation of the efficacy of the antiseptics.[1]

[1] This exercise is given in the General Bacteriology Laboratory Manual by L. S. McClung on page 63. The manual is published by W. B. Saunders Company.

Although we carry out the experiment as outlined above, at the same time we have added interest to the project by performing a second one, too. The technique we use is given below.

We inoculated a tube of melted agar very heavily with a species of chromogenic bacteria. *Sarcina lutea*, *Serratia marcescens*, *Bacterium violaceum*, or *Staphylococcus aureus* may be used. The agar was then poured into a Petri plate and allowed to harden. Then each student "painted" a design very carefully upon the surface of the inoculated medium. If the design is cut out of black paper the size of the Petri plate, and placed under the dish, it is easy to transfer the outline to the agar. Instead of using bacteria for "paint," as described by Sister Aquin, we used various antiseptics. Mercuric chloride, phenol, and Lysol were among them. The instructor may wish to have each member of the class use the same antiseptic. However, we found it interesting to have the class work in groups and each group use several antiseptics. Also, one could have a group work with the same antiseptic but different species of organisms, or combine different organisms and different

antiseptics. The time available for performing the experiment would be a determining factor in how much one could accomplish. We used a fine, # 0, paint brush for applying the antiseptic. An inoculating needle with a small loop is also useful.

After carefully "painting" the design the plate was incubated as usual. After a forty-eight-hour period the students were delighted with the results. Some plates were more satisfactory than others, naturally, as the complexity of the design, the technique of the student, and the antiseptic were all factors influencing the result.

Using this method, the bacteria grow over the entire surface of the agar except where the antiseptic has been spread. The design is a "negative," as it were, because it is formed by the lack of growth of the organisms rather than by their presence.

The experiment as outlined does not give any appreciation of the relative merits of the various antiseptics. This

Fig. 1. The background of this "painting" was made with *Micrococcus citreus*. The letters M M C, representing Mount Mary College, were made with full-strength Lysol. The photo shows the clear areas about the letters.

Fig. 2. Lysol was used for this design, also. The organism used for inoculation was *Serratia marcescens*. In color, the results were striking because of the contrast between the antiseptic-treated design and the orange-red background of the bacterial culture.

we determine from the standard experiment. This, of course, does not give too reliable a result, either. Perhaps, if the same design were "painted" with various antiseptics, and the same organisms were used, a comparison of the resulting figures would indicate the efficacy of the antiseptics. We have never done this.

To us, the main value of the experiment is to give added interest to the study of disinfectants and their effect upon the growth of bacteria.

(1) Aquin, Sister Mary. 1951. Bacteriology Project. *The American Biology Teacher*, 13: 10–11.

The letter on page 44 is of double interest to readers of *The American Biology Teacher;* because the subject—the history of the word "Biology"—and because of the writer—Ella Thea Smith, who is a long time member of The National Association of Biology Teachers, an active contributor to the journal, and the author of the well known and popular "Exploring Biology" which many American Biology Teacher readers have used as a text.

Material Aids Information

A new NABT service has been provided for by President Richard Weaver, who has appointed Dr. James M. Sanders, Chicago Teachers College, chairman of a new audio-visual committee. Other members of the committee are Mrs. Muriel Beuschlein, Parker Elementary School, Miss Mary Lu Pfister, DuSable High School, and Dr. Herbert Lamp, Chicago Teachers College. This personnel represents all teaching levels of experience although each member of the committee has taught or is teaching at the college level.

It is the plan to start by listing all of the free sources which can be found for films in or related to biology. The categories under which these are classified will of necessity be very general. Later if there is a sufficient volume of interest expressed it may be possible to list specific titles under appropriate categories. Perhaps ultimately it will be possible to review and evaluate new free loan films as they appear.

Any additional information on sources not mentioned here will be welcomed.

There will also follow additional lists of sources for free loan slide films.

After free loan sources have been exhausted, it is the present intent to list commercial sources which make, sell, and rent biological films and film strips. Reviews of new commercial films on biology are a possibility.

It is also hoped that special bibliographies and free materials lists can be published from time to time.

Sources

1. American Medical Association Committee on Medical Motion Pictures
   Film list from American Medical Association, 535 North Dearborn St., Chicago 10, Ill. Few free loans but mostly low rentals from the American Medical Association. Most of the films in this list are free loan from the source mentioned in the listing.
2. Association of American Railroads, Washington 6, D. C.
   Film Directory
   1. Railroad owned films
   2. Films available for industrial firms and commercial distributors
   3. Commercial firms and distributors listed in 2.
3. Educators Guide to Free Films (1951). Educators Progress Service, Randolph, Wisconsin. $6.00
   by Mary Foley Horkeimer and John W. Diffor
4. Federal Security Agency, Washington 25, D. C.
   A partial list of 16 mm. Film Libraries
5. Guide to U. S. Government Motion Pictures. Supt. of Documents, U. S. Printing Office, Washington 25, D. C. $0.40
6. Heimers, Lili
   Free films: A mimeographed list ($1.00) can be purchased from New Jersey State Teachers College, Upper Montclair, New Jersey
7. Illinois Bell Telephone Company, Chicago, Illinois
   Call Official 9100, Chicago, or your local Illinois Bell Company business office
   Two dozen film titles relating to communications
   Excellent films on actions of the vocal cords
8. Illinois State Library
   A list of film sources
9. Institute of Visual Training, 40 East 49th, New York 17, New York
   Several science titles
10. William Lewin (1951)
    Audio-Visual Bibliography
    Audio-Visual Guide, Vol. 17, pp. 21–28
11. H. P. Miller (1951)
    Free films for adult and youth groups—lists numerous sources
12. Audio-Visual Guide, pp. 16–18

13. Modern Talking Picture Service, 9 Rockefeller Plaza, New York 20, N. Y.
    Film catalog and index
    Several excellent films on biological subjects
14. Mr. Richard Hough, Modern Talking Picture Service, Inc., 142 East Ontario Street, Chicago 11, Illinois
    Same titles as above
15. Douglas D. Rothacker, 729 Seventh Avenue, New York 19, New York
    Educational Films—free of charge
16. School Life, May, 1950, Vol. 32, pp. 120–121
    How to Obtain U. S. Government Motion Pictures
    Same, May, 1951, Vol. 133, pp. 124–125
17. United States Steel Film Distribution Centers
    Birmingham Film Distribution Center, Tennessee Coal, Iron and Railroad Company, Brown-Marx Building, Birmingham 2, Alabama
    Chicago Film Distribution Center, United States Steel Subsidiaries, 208 So. La Salle Street, Chicago 90, Illinois
    Cleveland Film Distribution Center, American Steel and Wire Company, Rockefeller Building, Cleveland 13, Ohio
    New York Film Distribution Center, United States Steel Corporation, 71 Broadway, New York 6, New York
    Pittsburgh Film Distribution Center, United States Steel Company, 525 William Penn Place, Pittsburgh 30, Pennsylvania
    San Francisco Film Distribution Center, Columbia Steel Company, Russ Building, San Francisco 6, California
    Information on use of films outside the United States should be secured from United States Steel Export Company, 30 Church Street, New York 8, N. Y.
    Several titles
    See Conservation
    See Health
18. United World Films, Inc., 542 South Dearborn Street, Chicago 5, Illinois
    26 titles, of which half are biological
    See list
19. U.S.D.A. Forest Service Films. Forest Service, U.S.D.A., Washington, D. C.
    Lists of free loans
20. Izaak Walton League of America, Material Hdq., Chicago, Illinois
    Get list

Magazines about Films

1. Audio-Visual Guide, New York, New York
2. Journal of Biological Photographic Association, Baltimore, Maryland
3. Educational Screen, Chicago, Illinois

Agriculture—Conservation—Forestry

1. American Forest Products Industries, 1319 Eighteenth Street, N.W., Washington 6, D. C.
    Trees for Tomorrow—18 minutes
2. Associated Bulb Growers of Holland, 41 East 42nd St., New York 17, N. Y.
    Holland Blooms Again
    They Said It with Tulips
3. J. I. Case Company, Racine, Wisconsin
    Films
    Soil and Life
    Strips and Curves
    Others
    Also film strips—*sound*
4. Castle Films Division, United World Films, 50 Rockefeller Plaza, New York 20, New York or 542 South Dearborn, Chicago 5, Illinois
    Rubber Lends a Hand—28 minutes, 16 mm., technicolor sound movie. Available at no cost.
5. Caterpillar Tractor Company, Advertising Dept., Peoria, Illinois
    Write for titles
6. Chicago Tribune, Tribune Tower, Chicago, Illinois
    Trees to Tribune
7. Firestone Rubber Company, Akron, Ohio
    Miracle of Rubber—color, 22 minutes, sound
8. Hercules Powder Company, Wilmington, Delaware
    Reclaiming Land with Dynamite
9. Illinois State Department of Conservation
    Trees for Tomorrow—sound, 18 mm., also pamphlet
    Also available from
10. Illinois State Forester, Illinois Director

of Vocational Education, and Illinois Division of Department Reports

11. International Harvester Company, 180 North Michigan, Chicago 1, Illinois
    See film list
12. Mahogany Association, Inc., 75 East Wacker Drive, Chicago 1, Illinois
    Mahogany—Wood of the Ages—Yesterday, Today, and Tomorrow
    The Romance of Mahogany
    Modern Masterpieces in Mahogany
13. The National Fertilizer Association, 616 Investment Building, Washington 5, D. C.
    The Life of the Soil—Northern editorial, 33 minutes
    What's in the Bag?—18 minutes
    Hunger Signs—15 minutes
    Also Kodachromes
14. National Garden Bureau, 210 South Desplaines St., Chicago 6, Illinois
    5 titles—all excellent for biology, botany, or agriculture
15. International Film Bureau, 6 N. Michigan Avenue, Chicago 2, Illinois
    Has some free films on plant activities—only for Chicago teachers
16. Terminix Company, consult the one in your vicinity or write E. L. Bruce Company, Memphis, Tennessee
    Hidden Enemies—16 mm., sound, 25 minutes, microscopic views of the ingenious termite family at work
17. U.S.D.A. Films from Visual Aids Service, University of Illinois, Champaign, Illinois, or the nearest distributor. Write your state regarding college
18. C. L. Venard, Peoria 2, Illinois
    Films sponsored by the Sears Roebuck Foundation—see the film list
    Battle for Life Series—various running times
    The Story of Our Civilization Series—40 minutes each, 16 mm., sound
    Soil Conservation and Farm Management Series

Food—Nutrition

1. American Can Company, Home Economics Section, Dept. GT–3–50, 230 Park Avenue, New York 17, New York
    Vitamin Rivers—22 minutes, 16 mm., sound, color film, free
    Alaska's Silver Millions—30 minutes
    Jerry Pulls the Strings—30 minutes, coffee
2. American Society of Bakery Engineers
    Free films—list, write C. G. Harrel, Director Department of Visual Education, 208 Third Avenue, S.E., Minneapolis, Minn.
3. Evaporated Milk Association from Castle Films, 542 South Dearborn, Chicago 5, Illinois
    Modern Milk—16 mm., sound, 24 minutes. Upper grades, high schools, and colleges
4. The Great Atlantic and Pacific Tea Company
    Coffee—The Pride of Colombia
    Bread—More Power to You
    Available from
5. Y.M.C.A. film booking office, 205 S. Michigan Ave., Chicago, Ill.
6. Council on Candy of the National Confectioner's Association, 1 North La Salle, Chicago 2, Illinois
    Candy and Nutrition—sound film, 20 minutes
7. General Electric Company, Educational Consultant, 840 South Canal St., Chicago 80, Illinois. Also Schenectady 5, New York
    Ingredients—16 mm., color, 23 minutes
    Frozen Foods—16 mm., color, 40 minutes
8. General Mills, Inc., 400 Second Avenue, South, Minneapolis 1, Minnesota
    The School That Learned to Eat—color, sound, 25 minutes
9. General Motors, Department of Public Relations, Film Section, General Motors Building, Detroit 2, Michigan
    Catalog of 41 titles with running times and shipping weight, with full postal tables and instructions. See especially Doctor In Industry
10. Mead Johnson and Company, Evansville 2, Indiana
    3 groups of films—16 mm., surgical, obstetrical, pediatric. Some subjects suitable for college students—not generally appropriate or available for day groups outside of Medicine

11. Sugar Information, Inc., 52 Wall Street, New York 5, New York
    The Gift of Green—18 minutes
    Crystal of Energy—25 minutes
12. Seavey and Florsheim Brokerage Company, 38 South Dearborn, Chicago 3, Ill.
    Kopa A—30 minute color film on sugar from cane to table
13. Swift and Company, Agricultural Research Department, Chicago 9, Illinois
    Films
    Livestock and Meat—49 minutes
    Cows and Americans—U. S. A.—25 minutes
    By-Products—10 minutes
    A Nation's Meat—30 minutes
    Meat Buying Customs—10 minutes
14. Westinghouse Electric Corporation, Box 1017, 306 Fourth Avenue, Pittsburgh 30, Pennsylvania
    School service—14 titles. See especially
    Menacing Shadows—20 minutes
    40 Billion Enemies—controlling food bacteria, 26 minutes

Health—Safety

1. American Foot Care Institute, 1775 Broadway, New York 19, New York
    The Walking Machine—16 mm., sound, black and white, 14 minutes
2. Affiliated Aetna Life Companies, Hartford, Conn.
    Aetna Educational films—22 titles, sound, 16 mm., some color with very wide range of interest appeal—Sport–Safety–Anti-Crime—order from The Aetna Casualty and Security Company, D. K. Weiser, Manager, 120 S. La Salle, Chicago, Illinois
3. The American Red Cross, 529 South Wabash Avenue, Chicago, Illinois
    Films—see list. Also strip films and slides
    A Life in Your Hands—10 minutes, 16 mm., sound
    Volunteer 5420—20 minutes, 16 mm., sound
    There Is No Substitute
    Order from Local Chapter if in a large city, otherwise write American National Red Cross, Washington, D. C.
4. Association Films, Inc., Four locations:
    35 West 45th Street, New York 19, New York
    206 South Michigan Avenue, Chicago 3, Illinois
    351 Turk Street, San Francisco 2, California
    1915 Live Oak Street, Dallas 1, Texas
5. Sam S. Blane
    Films for a course in Health Education: Audio-Visual Guide, May, 1951
6. Chrysler Corporation distributed by Ideal Pictures Corporation, 58 East South Water Street, Chicago 1, Ill.
    Primarily Social Science and Travel—see list
7. Cutter Laboratories, 5820 Northwest Highway, Chicago, Illinois
    Films
    Blood Bank
    Communicable Disease
8. Department of Public Health, Springfield, Illinois
    Film catalog—Circular 33
    Also list of film strips
9. General Motors Corporation, 3044 West Grand Boulevard, Detroit 2, Mich.
    Doctors in Industry—60 minutes, black and white, sound
10. International Cellucotton Products Company, 919 North Michigan Avenue, Chicago 11, Illinois
    The Story of Menstruation—color, 16 mm., sound, 10 minutes
    Also distributed by Association Films
11. Johnson and Johnson, New Brunswick, New Jersey
    Help Wanted—a first aid picture, 35 minutes. Also one on
    Care of the Baby
12. Lederle Laboratory Division, American Cyanamid Company, 30 Rockefeller Plaza, New York 20, New York
    Motion picture lists on Medical and Veterinary Medicine—usable at college level
13. Mallinckrodt Chemical Works, St. Louis 7, Missouri
    The Advent of Anaesthesia—9 minutes, black and white, sound
14. Metropolitan Life Insurance Company,

1 Madison Avenue, New York 10, New York
Catalog of films on Health and Safety

15. State of Minnesota Department of Highway, 1246 University Avenue, St. Paul 4, Minnesota
Many films—traffic, safety. Limited to State of Minnesota

16. The National Foundation for Infantile Paralysis, 120 Broadway, New York 5, New York
List of films

17. The National Society for Medical Research, 185 North Wabash Avenue, Chicago 1, Illinois
Man's Greatest Friend—12 minutes
The Story of Dr. Jenner—12 minutes
They Live Again—Story of Insulin, 12 minutes

18. The Proprietary Association, Institute of Visual Training, 40 East 48th Street, New York, New York
For Us the Living—films on animal experimentation

19. Public Health Service, Federal Security Agency
Several titles—loaned only to State Health Departments and some local departments
Order list from Federal Security Agency and try your own State

20. Schering Corporation, Bloomfield, New Jersey, Medical Service Dept., 2 Broad Street, Bloomfield, New Jersey
The Physiology of Normal Menstruation—22 minutes, color, sound
The Male Sex Hormone—color, sound, 20 minutes

21. John Tracy Clinic, 924 West 37th Street, Los Angeles 7, California
Eyes That Hear—16 mm., sound, 17 minutes
Listening Eyes

22. Tennessee Valley Authority, Chattanooga, Tennessee
Film Service
Malaria Control in the Tennessee Valley—16 mm., sound, color, 4 reels, 40 minutes, limited to colleges and universities special Health and Safety groups
Other films on Conservation, etc. available from Bob. H. Matthews, T. V. A. Film Service, Knoxville, Tennessee

23. United States Department of Interior, Bureau of Mines, Washington, D. C.
Extensive list—some related to Health and Safety

24. *Information* on use of films outside the United States should be secured from United States Steel Export Company, 30 Church Street, New York 8, N. Y.
Help Yourself Beat the Heat—Kodachrome, 16 mm., sound, 12 minutes

25. The Upjohn Company, Kalamazoo, Michigan
Gel Foam in Surgery—good for Premedics, 35 minutes

26. War Department, U. S. Army office of the Surgeon General, Pentagon Building. Also Army Headquarters of your area.

27. Wellcome Physiological Research Laboratories, Tuckahoe 7, New York
The Preparation of Diphtheria Antitoxin and Prophylactics—black and white, sound, 35 minutes

Sport—Fishing—Hunting

1. Evinrude Motors Division, Outboard Marine and Manufacturing Company, Milwaukee 16, Wisconsin
Chicago Dealer—Russ Leonard Boat and Motors, 3537 North Western Avenue, Chicago, Illinois
Film list—fishing, shows western country of interest to Conservation and Wilderness groups

2. South Bend Bait Company, 1108 High Street, South Bend 23, Indiana
13 titles for sportsmen, on fishing—also Conservation areas, see catalog

Textiles—Paper—Rubber

1. Consumer Service Section, American Viscose Corporation, Box 864, A. P. O., New York, New York
Science Spins a Yarn—color, 16 mm., sound, 25 minutes
How Rayon Is Made—black, 16 mm., sound, 25 minutes
Also strip films of same title

2. General Electric, 840 S. Canal St., Chi-

cago 80, Ill., or Schenectady 5, N. Y.
A Woolen Yarn—silent, 15 minutes
The World of Paper—silent, 29 minutes

3. B. F. Goodrich from Castle Films, 1445 Park Avenue, New York City, N. Y.
Rubber Lends a Hand—16 mm., technicolor, 40 minutes

4. Goodyear Tire and Rubber Company, Motion Picture Department, Akron, Ohio, and Los Angeles, California
15 films—sound, 16 mm.
9 films—silent, 16 mm.

5. Hammermill Paper Company, Room 1950, One La Salle Street Building, 1 North La Salle, Chicago 2, Illinois
The Gift of TS'AI LUN—Paper—16 mm., sound, 35 minutes, 12-foot reel

6. Hercules Powder Company, Wilmington, Delaware
Careers for Cellulose—16 mm., sound, color, 30 minutes
Others

7. Rayon Division, E. I. Du Pont de Nemours and Company, Inc., Empire State Building, New York, New York
Facts About Fabrics—sound, 26 minutes
Fashion's Favorite—sound, 33 minutes
Also from Motion Picture Division, Advertising Dept., Wilmington 98, Del.

8. United States Rubber Company, Public Relations Department, 1230 Avenue of the Americas, New York 20, New York
Speaking of Rubber—16 mm., black and white, sound, 27 minutes. Grades 6, 7, 8, and High School
7 educational titles—high school and above
7 entertainment titles

Miscellaneous

1. Bausch and Lomb Optical Company, Rochester 2, New York
To Greater Vision—16 mm., sound, 28 minutes
Eyes of Science—16 mm., silent, 45 minutes

2. Denoyer-Geppert Company, 5235 Ravenswood, Chicago 40, Illinois
How Anatomical Models Are Made—16 mm., black and white, sound, 35 minutes

3. Lion Oil Company, El Dorado, Arkansas
Revolution in the South—16 mm., sound, color, 24 minutes (Solidly booked for 1951–52)

In addition to the films listed, numerous free materials on medical progress and animal experimentation are obtainable from either the Illinois Society or the National Society for Medical Research, 185 North Wabash Avenue, Chicago 1, Illinois. Mention ABT.

Some Implications for Using Films in the Teaching of Biology

GEORGE GREISEN MALLINSON
Western Michigan College of Education, Kalamazoo, Michigan

The values that are obtained from the judicious use of motion picture films in the teaching process have long been recognized. Hence, it is platitudinous to prepare either an oral or a written defense for them. However, it is unwise to assume that the most effective ways for using films have been determined. It is equally unwise to assume that any film used at any time may offer a fruitful educational experience.

A survey of recent studies that deal with the use of films indicates that investigators are concerned with the optimal methods for using them. This is especially true in the field of science.

Hence, it was decided to review a number of these recent studies with particular reference to the field of biology, and to abstract and summarize the implications found in them. The implications of these various studies have been categorized under headings to which they seemed logically to belong.

1. To what extent are films available for teaching biology? One of the most extensive recent studies was that undertaken by seven major publishers entitled *A Report to Educators on Teaching Films Survey* (2). This study was based on information from these sources:

"a. Questionnaire replies from superintendents, assistant superintendents, visual-education directors, principals, elementary-school teachers, and high-school teachers in 424 of the 501 largest public-school systems in the country . . . .

"b. One hundred thirty-seven personal interviews . . . with visual-education directors in major cities, motion-picture producers, projector manufacturers, film distributors, heads of film-lending libraries, and other key persons in this field . . . .

"c. Approximately 120 other interviews with persons who for various reasons sought interviews with the Editor.

"d. A thorough review of literature bearing on visual education and published in the past ten years.

"e. 'Evaluation reports' made by members of the staffs of the sponsoring publishers after reviewing a number of the most popular films now available for school use."

The study indicates clearly that teachers of high-school biology make greater use of films than teachers in any other subject-matter field. Seventy-five per cent of the junior-high-school teachers, fifty-four per cent of the high-school principals and forty-two per cent of the senior-high-school teachers of biology who responded reported frequent use of films in the area of biology in their respective schools and classes. Further, the percentage of teachers who indicated that they did not use films at all was smaller in the field of biology than in any other subject-matter field. The study indicates also that more films are available in the field of high-school botany than in any other field.

Mallinson reported the results of four investigations (4, 5, 7, 8) in which films were previewed, evaluated and listed for use in teaching science. The greatest number was found in the area of biology or in allied fields, such as health education. This was true of films designed for use at both the elementary- and secondary-school levels.

Hence it seems reasonable to state that there are many films available for use in the teaching of biology at all levels.

2. To what extent are films easily obtainable for use? The *Teaching Films Survey* (2) and the investigations by Mallinson (4, 5, 7, 8) indicate also that one of the major problems in the use of films is the difficulty of obtaining them when they are needed. The problem of "can't get films when desired" was listed more frequently by both elementary- and secondary-school teachers than any other.

The reasons for this difficulty are known to all teachers and hence will not be mentioned here. However, a few suggestions were offered in these studies to solve the difficulty. One that seemed to be of value was the establishment of small local film libraries operated cooperatively by adjacent school districts. Under such a plan each of the cooperating schools would buy every year one of the most popular films and would store them in a centralized location. Thus the films would be available for

almost immediate loan. Obviously the purchase of one film per year would tax greatly the appropriations for visual aids. However, the ready availability of fewer films might compensate for using a greater number somewhat off schedule.

3. To what extent are films accurate and free from error? The *Teaching Films Survey* (2) and a study by Mallinson (3) indicate that a great number of films for biology contain errors and misconceptions. The first report indicates that criticism of defects in subject matter and content is least from teachers of the primary grades, greater from those of the intermediate grades and greatest among teachers of the upper grades. The evidence indicates that from sixteen to thirty-one per cent of the elementary-school teachers surveyed criticized films with respect to this point, while twenty-six to twenty-nine per cent of the secondary-school teachers did likewise. The second study (3) substantiates the findings of the one just mentioned. Many of the films that were examined contained information that was erroneous, and also presented information in a manner likely to cause misconceptions in the minds of the students.

Thus the preview should accomplish more than its traditional aim of familiarizing the reviewer with the content of the film. Rather, during the preview, the film should be scrutinized carefully to locate such errors and misconceptions. These should then be brought to the attention of the students before the film is shown to avoid the necessity of reteaching students the accurate facts and concepts.

4. To what extent are films suitable for the age groups for which they are designed? The *Teaching Films Survey* (2) and an investigation by Mallinson (6) indicate that films are frequently too difficult for the groups for which they are designed. The results of the *Teaching Films Survey* indicate that many teachers find films for biology "too technical or too involved" for the group for which they are designed, and that the vocabulary is generally above the desired grade level.

The second investigation consisted of transcribing the sound tracks of two sound films prepared by each of five major film publishers. The films met these qualifications:

a. They were to be among those that the publisher rated "best" in his library.

b. One was to deal with a topic in the area of biological science; the other, physical science.

The transcriptions were then checked against the Buckingham and Dolch (1) word list. The results indicate that, while the "visual" portions of films in general seem satisfactory, the "audio" portions seem to have been neglected. Many films dealing with biological science contain words above the grade level of students for whom they are designed. They contain combinations of words that render them even more difficult to understand. For example, in the narration of one film this sentence appeared: "For by virtue of the muscles that encircle the walls, small arteries are able to constrict or to dilate to increase or decrease their internal caliber." Thus, attention needs to be paid to the "listening difficulty" of the sound film.

Summary

Recent investigations in the use of films for teaching biology are concerned not with efforts to justify their use, but rather with their most effective use. The investigations reveal that many films are available for use in teaching biology, that a great number are rated highly, and that biology teachers tend to use them extensively.

However, the limitations to their use

have been pointed out sharply. The major problem, that of getting films when needed, has yet to be solved. Further, films for one reason or another contain errors and misconceptions. The preview, therefore, should have as an aim the identification of inaccuracies, not merely the acquisition of knowledge of film content. Also, the teacher should analyze carefully the "audio" content of biology films. Many films desirable from the "visual" aspect may be wholly undesirable from the "audio" aspect.

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(1) Buckingham, B. R., and Dolch, E. W., *A Combined Word List*. Boston: Ginn and Company, 1936. Pp. iii + 185.

(2) Committee of Publishers (Philip A. Knowlton, ed.), *A Report to Educators on Teaching Films Survey*. New York: Harper and Brothers, 1948. Pp. viii + 117.

(3) Mallinson, George G., "Errors and Misconceptions in Films for Science." *The Science Teacher*, XVI (October 1949), 124–6.

(4) ———, "Motion Pictures for Elementary Science." *School Science and Mathematics*, XLIX (May 1949), 383–91.

(5) ———, "Motion Pictures for High School Science." *School Science and Mathematics*, XLVIII (October 1948), 525–34.

(6) ———, "Narration in Films for Science." *The Science Teacher*, XVII (December 1950), 220–1.

(7) ———, *The Use of Films in Elementary Science*. Faculty Contributions, Series II, No. 2, Graduate Division, Western Michigan College of Education, Kalamazoo, Michigan, June 1950. Pp. 23.

(8) ———, *Visual Aids: The Use of Films in High School Science*. Educational Service Publications, Issue No. 9, Bureau of Extension Service, Iowa State Teachers College, Cedar Falls, Iowa, September 1948. Pp. 22.

(9) Pella, Milton O., "Audio-Visual Aids in Teaching Science." *The Science Teacher*, XVI (February 1949), 24–5, 45.

THE FEATURE "Biology in The News" appears for the first time in this issue. The citations are from periodicals that are available in many homes and most libraries throughout the country. *Biology in The News* is contributed by a committee in charge of Brother H. Charles, long time associate editor of ABT.

REGIONAL MEMBERSHIP CHAIRMEN

Robert C. McCafferty, Vice-President of THE NATIONAL ASSOCIATION OF BIOLOGY TEACHERS and National Membership Chairman, has submitted the following list of Regional chairmen. The states in some of the regions have been regrouped, as indicated below.

Region I. Mabel Potter, Technical High School, Springfield, Massachusetts.

Region II. Joseph F. Horvath, P. O. Box 273, Mahanoy City, Pennsylvania.

Region III. Arthur J. Baker, 72 McHenry Av., Crystal Lake, Illinois.

Region IV. C. W. Lantz, Iowa State Teachers College, Cedar Falls, Iowa.

Region V. Charles E. Packard, Box 7, Star Route, Ashland, Virginia.

Region VI. Mrs. Aldina S. Gates, Box 8198, Univ. Sta., Baton Rouge 3, Louisiana.

Region VII. Howard E. Weaver, Texas Forest Service, College Station, Texas.

Region VIII. Clifford D. Knapp, Gallatin County High School, Bozeman, Montana.

Region IX. Leo F. Hadsall, Fresno State College, Fresno, California.

Region III, under Arthur J. Baker, now consists of Ohio, Indiana, Illinois, Michigan, and Wisconsin.

Region IV now includes the Dakotas, Minnesota, Iowa, Missouri, Nebraska, and Kansas. Dr. Lantz will coordinate the conservation-education program as well as membership activities.

Region V, under the leadership of Charles E. Packard of Randolph-Macon College, now includes Delaware, Maryland, Virginia, West Virginia, Kentucky, and Tennessee.

Region VI has been consolidated and now includes the Carolinas, Georgia, Florida, Alabama, Mississippi, Arkansas, and Louisiana; it is guided by Mrs. Aldina Gates of Baton Rouge.

Region VII now comprises Oklahoma, Texas, Arizona, and New Mexico. Dr. Weaver will also direct the NABT conservation program in the south-west, a task that is quite similar to his full time program with the Texas Forest Service. In this Service he works in cooperation with the Texas Education Agency and state resource-use agencies engaged in a state-wide conservation-education program for the schools. He also serves as forestry consultant at teacher workshops in the colleges and universities over the state.

Double-Tray Slide Holder

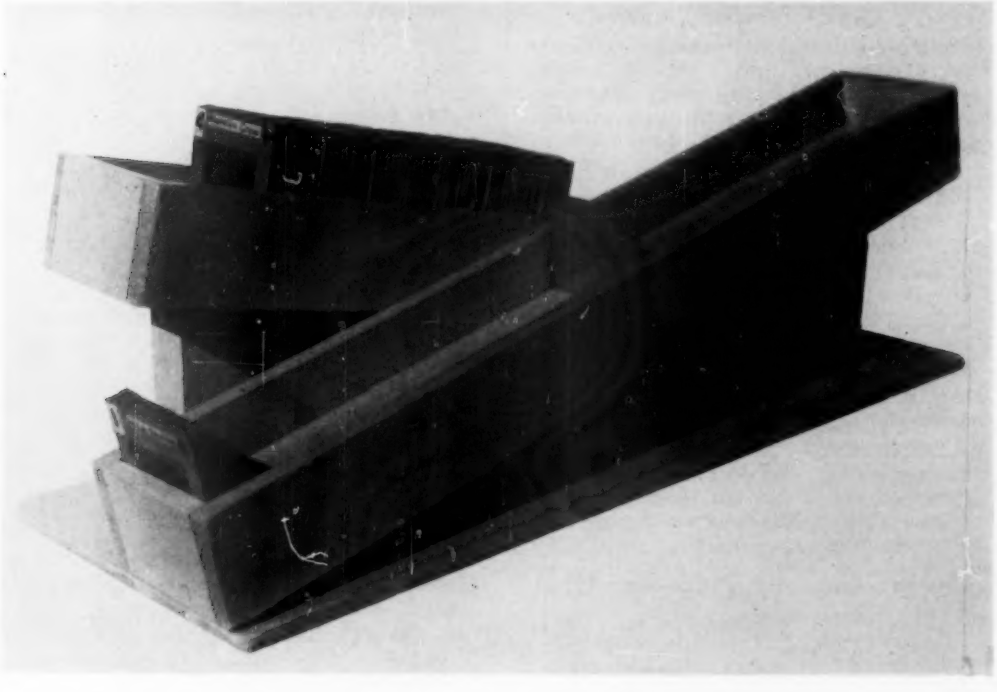
Many biology teachers have had trouble showing 2×2 slides and keeping them in order for use the next period. This double-tray holder with trays sloping in opposite directions makes it possible to project a set of 2×2 slides and keep them in order as they come from the projector.

Slides to be shown are placed in the desired order in the left-hand tray, No. 1 at the front end sloping backward. As the slides come from the projector they are placed in the front end of the right-hand tray sloping forward. If the slides are to be used the next period or later in the day, they are put back in the left-hand tray in the same order.

Saw cuts across the inside of the tray bottoms are provided for metal dividers in case a small set of slides or more than one set are to be shown the same period.

Almost any student who has access to a woodworking shop can easily make one of these slide holders.

EDWIN F. SANDERS,
1330 Russet Street,
Racine, Wisconsin



The following note from Oscar Riddle, who is in a real sense the father of NABT, was inadvertently omitted from the December issue.

My dear Breukelman:

I wish it were possible for me to attend the NABT meetings in Philadelphia this year and to be present at meetings of the Editorial Board on Saturday, December 29.

Perhaps the best a member of the Advisory Council can do is to record his appreciation of the efforts of those who are carrying the load for the Journal and for the Association. Certainly that is much in my mind. It seems to me that the article by Dr. Martin in the current (November) issue is of supreme importance to high school teachers of biology. Obviously, however, there can be few such articles.

. . . With all best wishes, I am,

Cordially yours,

OSCAR RIDDLE,
Plant City, Florida

NATIONAL INSTITUTE FOR SCIENCE TEACHERS

(*Continued from the January Issue*)

Universities and colleges of engineering and science should:

Take a hard look at their dropout rates; estimates indicate that 60% of each entering engineering class does not graduate. Such a high rate of dropouts tends to discourage secondary school teachers from recommending engineering as a career. This item might warrant thorough consideration by the American Society for Engineering Education.

Establish opportunities and courses, basic to science and engineering, for local secondary and elementary school science teachers to increase their teaching effectiveness through broadened horizons.

Survey students now enrolled in liberal arts departments with a view to locating students who may have been directed away from engineering and science by oversupply estimates made in 1950.

Examine course offerings and determine the extent and degree of mathematical proficiency that is required for different career opportunities in engineering and science.

Establish educational programs for individuals who have dropped out of engineering and scientific schools who, although lacking professional ability, would make satisfactory technical assistants.

Encourage many more girls to take up careers in engineering and science.

Emphasize the formal evaluation and encouragement of individuals based on their originality and not their "talent" to commit the achievements of others to memory.

Industry—large and small—should:

Educate its stockholders to permit greater utilization of its 5% tax deduction privileges for grants to non-profit institutions. For example, establish scholarships according to financial need for outstanding boys and girls in each locality, who show ability and originality in the fields of science and engineering.

In addition to college scholarships, explore the possibilities of providing special scholarship help to able high school students showing originality and potential proficiency in engineering and science. Such scholarships would enable individuals to enroll in secondary schools where their potential in these fields can be fully developed.

Encourage official cooperative effort with local schools to provide avenues of communication, understanding and learning concerning the role of engineering and science in our technological society.

Encourage, through financial remuneration if possible, qualified retired personnel to spend their "active" time on industry-school relationships, at both the teacher and student level, in developing engineering and scientific interests of youth.

Make every effort to place high school science and mathematics teachers, as well as vocational guidance counselors, in summer jobs that will add to their ability to become more effective teachers. The General Electric Company type of summer fellowship awards for high school teachers should be adopted by many more industries.

Make every possible effort to use trained or potential engineers and scientists in work that fully utilizes each individual's competence.

Explore new manpower pools such as women, older people, handicapped persons and others for possibilities in providing persons who, by training, could become technicians and thus free engineers and scientists for more complex professional duties.

Provide career opportunities at all levels for women in engineering and science.

Establish educational programs for individuals who have dropped out of engineering and scientific schools and who would make adequate technical assistants. Also locate and regain individuals who were trained as engineers and scientists but are now lost to the field.

State and Federal Governments should:

Encourage private interests to establish scholarships for engineering and science-bound students. Government should consider a limited scholarship program where gaps appear in private support.

Through the U. S. Office of Education and State Departments of Education, develop suggestions and guides for teachers so that an increased number of students will have real exploratory experiences in science and mathematics in their high school studies.

Provide well organized and correct source lists to teachers, parents and students indicating scholarships related to engineering and science that are available upon application and acceptance.

Make every possible effort to use trained or potential engineers and scientists on work that utilizes each individual's competence—particularly in the armed services.

Include representatives from secondary schools as members of manpower committees of such organizations as Selective Service, National Research Council, National Security Resources Board of the Department of Defense, and others.

In formulating Selective Service policies, recognize that high intellectual ability, related to engineering, science, mathematics, and other areas, is a precious natural resource which should be utilized in the best interests of the whole country so that the United States may be kept at the forefront of human achievement.

Study present educational programs in mathematics and science at the elementary and high school level and consider how these programs and courses can be strengthened in relation to engineering and science careers.

Vocational guidance personnel and organizations should:

Equip themselves with vivid descriptive accounts of different types of work performed by engineers and scientists in the various branches of their professions. These descriptions should show the relationship of the profession to the strength and growth of our civilization.

Stress the values of engineering training to students and parents as a preparation for many occupations which are often not readily associated with engineering and scientific work. Point out that many sales and industrial managers of today must be informed on technical matters in order to competently perform their jobs.

Arrange for student meetings with men at the "workbench." Guidance people should supply statistical and written information to the student which should be supplemented by personal contact between student and local career men in the students' field of possible vocational interest.

See that students become personally acquainted with individuals in as many different careers as possible before the student "freezes" his mind to his vocational choice.

Foundations should:

Support research in the field of the history of technology. An objective analysis should be made of the fundamental reasons for our industrial strength as related to the contributions of engineering and science. Use of England as a case history of industrial decline affords an excellent historical perspective.

Finance sabbatical leaves for high school science and mathematics teachers so that they can vitalize their teaching with personal experiences in industrial, university, engineering and scientific efforts in research, development, production and distribution.

Specifically underwrite scholarship programs for girls in engineering and science.

Support exhaustive research studies to determine why many young people develop, during their formal educational process, a dislike for mathematics and science noting that this is in contradiction to their former interest in everything.

Local community organizations (parent-teacher associations, boards of education, womens' clubs, service clubs, college alumni groups, etc.) should:

Establish larger numbers of scholarships for boys and girls showing ability and originality in scientific and engineering fields.

Work for tax support for increasing salaries of science and mathematics teachers on a merit system based on individual performance and thus meet the unusual competition in specialized fields of industry and government.

Work for improved teacher-student ratios in the classroom.

Work for adequate and effective laboratory facilities and equipment for science classrooms.

Sell taxpayers on the desirability of each community providing sabbatical stipends for outstanding science and mathematics teachers so that they may continue their professional studies and become better informed of the developments in science and engineering of industry, government and universities.

Conduct discussions, at Parent-Teacher Association meetings, on the opportunities in engineering and science and the fundamental role the engineer and scientist plays in the modern industrial state. Adequate historical and statistical material should be available for their use from the Engineering Manpower Commission and Departments of the State and Federal Government.

Mass media should:

Call to the public's attention those industrial firms and educational institutions that are doing a good job of pointing out shortages, needs and opportunities in engineering and science.

Provide the public with up-to-date and accurate information obtained from the Bureau of Labor Statistics, the National Research Council, and the Engineering

Manpower Commission, etc., concerning supply, needs, and qualifications in the engineering and scientific professions.

Through a public service campaign of the Advertising Council, stress the need for many more engineers and scientists for as far into the future as is foreseeable. Institutional advertising should, as much as possible, explain the fundamental role the engineer and scientist plays in our technological civilization.

Report the accomplishments of high school students and teachers which emphasize activities that encourage youth to seek engineering and scientific careers. Publicity for winners of science fairs, science congresses, science talent searches, and the achievements of individuals active in local science clubs should be as wide-spread as possible.

Point out the many opportunities for women in engineering and scientific careers.

Popularize engineering and science through the story type of approach and utilize success stories of contemporary individuals in engineering and science.

Conclusion:

Participants agreed, " Engineers and scientists, under present world conditions, provide technical strength for protection against those who could destroy our free way of life. We must sharpen the spear that we hold in one hand while we apply the trowel with the other." [1] To fulfill this goal, engineers and scientists are needed by the tens of thousands for industry and government. To fill the pipelines, educators must utilize every opportunity to provide the required leadership, at the elementary and high school levels, to thoroughly arouse enthusiasm and interest in *many more students to take up careers in engineering and science.*

LETTERS

Dear Dr. Breukelman:

At the suggestion of Mr. A. B. Clark, of Phoenix, Arizona, I am writing to suggest that *The American Biology Teacher* take the lead in planning some fitting way of celebrating the 150th anniversary of the invention of the word *biology*. The year 1952 marks the sesquicentennial of that invention . . . .

Perhaps a brief review of some of the salient points in the history of the word *biology* might serve as a spring board for planning a sesquicentennial program in biology classes all over the nation. Might it not be a happy idea to suggest that such programs occupy a class period during the last week of May? This would bring the matter to the attention of students who have already had a course in biology. If the programs were planned for next fall, students would be starting the course. They might not appreciate it as much as those with more background. However that may be, the following items may be of interest to those teachers who wish to plan programs. They are based on *The Oxford English Dictionary* and Allibone's *Dictionary of Authors.*

1. The word was invented by the German naturalist, Gottfried Reinhold, also known as Treveranus, in 1802, and was first printed in his *Biologie* of that year.
2. Jean Baptiste Lamarck borrowed the word and used it in his *Hydrologie*, published later the same year, 1802.
3. The word appeared in print in English for the first time in 1813. It was used by James Field Stanfield in his *Essay on the Study and Composition of Biography*, published in London that year. He said "There exists what might be called biology, as well as biography," and "If the biologist (should a distinctive term be allowed) come not to his study with the same spirit of impartiality that is required of the biographer, ..." Stanfield seems to have used the term to mean a study of man, rather than all living things.
4. In 1819, William Lawrence used *biology* in his *Lectures on Physiology, Zoology, and the Natural History of Man*, thus: "A foreign writer has proposed the more accurate term of biology, or the science of life."
5. By 1847, the word was coming into fairly wide use, as indicated by a quotation from William Whewell's *Philosophy of the*

[1] Dr. A. H. Compton, speaking in St. Louis, May 1951, at the National Science Fair.

Inductive Sciences, Second Edition, London, 1847: "The term Biology—has of late become not uncommon, among good writers." This man Whewell seems to have stirred up a deal of controversy in England. For example, a Reverend Albert Barnes accused him of making science seem as changeable as "the ever-changing sands on the shores of the ocean" rather than as "fixed, certain, and stable" as "the everlasting hills." Perhaps this early historian of the sciences foreshadowed the modern point of view.

These are only suggestions. A program entitled "Then and Now" might be introduced with a similar brief history of the word.

I enjoy every issue of *The American Biology Teacher*, and find it both helpful and stimulating.

Sincerely yours,

ELLA THEA SMITH

BIOLOGY IN THE NEWS

Food Poisoning Can Get You, Too by Steven M. Spencer, *Sat. Eve. Post*, Jan. 5, 1952, pp. 25 & 80–82.

How those food-poisoning germs get to your table.

Your Eyes Must See You Through by Liam O'Connor, *American Mag.*, Jan. 1952, pp. 36–37 & 89–93.

Eyestrain and who's who among correction specialists.

Science Conquers the Mite Plague by Glenn D. Kittler, *Coronet*, Feb. 1952, pp. 53–55.

DDT helps mites by killing their natural enemies. Aramite kills only mites.

Too Young to Die by Hardy Burt, *Red Book*, Jan. 1952, pp. 31 & 62–63.

Basic steps to prevent the accidents which kill more of our young than any disease.

Heredity—And You by Amram Scheinfeld, *Cosmopolitan*, Jan. 1952, pp. 66–67 & 106–108.

Resume of diseases which can be inherited and some which cannot.

Do You Favor Sex Education in Our Schools by Irene Dunne and Ernest Osborne, *McCalls*, Jan. 1952, pp. 28–29 & 91.

A controversy between the two authors and a resume of a teen-age quiz.

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